

Tab 1

PRACTICAL : 3

Lab 1: Introduction to ChatGPT

1. What is ChatGPT?

ChatGPT is an AI language model developed by OpenAI that can understand and generate human-like text. It can hold conversations, answer questions, write essays, generate code, and more.

2. Origin of ChatGPT

- Based on the GPT (Generative Pre-trained Transformer) architecture.
 - GPT was introduced by OpenAI, with the first version in 2018.
 - ChatGPT, specifically, was launched in late 2022, built on GPT-3.5 and later GPT-4.
 - Trained on massive datasets of text from the internet using machine learning techniques, especially transformer neural networks.
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3. Capabilities of ChatGPT

- Natural language understanding & generation: Conversations, explanations, translations.
 - Creative writing: Stories, poems, scripts, marketing copy.
 - Summarization: Condensing long texts into summaries.
 - Image & voice understanding (in GPT-4 multimodal versions).
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4. Real-World Applications

- Education: Tutoring, homework help, personalized learning.
- Business: Customer support chatbots, email drafting, market analysis.
- Healthcare: Medical information assistance, patient communication templates.
- Creative industries: Writing assistance, brainstorming ideas, content creation.
- Programming: Code generation, debugging, explanations.
- Everyday use: Personal assistants, scheduling, language translation.

❖ Explore the ChatGPT interface

1. Accessing ChatGPT

- Visit chat.openai.com or open the ChatGPT app (if available).
 - Log in or create an OpenAI account to start using ChatGPT.
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2. Main Interface Components

- Chat Window:
The large area where you type your prompts/questions and see responses.
 - Input Box:
At the bottom, where you type your message or prompt. Press Enter or click Send to submit.
 - Sidebar (optional):
Shows your chat history, allows starting new conversations, and accessing settings.
 - Settings/Profile Menu:
Usually top right, where you manage your account, subscription (Plus/Pro), and preferences.
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3. Using the Input Box

- Type anything: a question, command, or even casual chat.
 - You can write:
 - Simple questions ("What's the capital of France?")
 - Instructions ("Write a poem about summer.")
 - Complex prompts ("Explain quantum physics in simple terms.")
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4. Interacting with Responses

- You can continue the conversation by typing follow-up questions.
- If a response is unclear or incomplete, ask for clarification or "Explain more."
- Use commands like "Summarize," "Translate," or "Rewrite this."

❖ **Study transformer architecture using visualization tools**

- **Recommended visualization tools:**
 - The Annotated Transformer (interactive online walkthrough)
 - TensorFlow's Transformer Visualizations (shows attention heads)
 - BERTViz (for visualizing attention in transformers)
 - Distill.pub's "Attention is all you need" interactive article
 - **Key concepts to focus on:**
 - Self-attention mechanism
 - Multi-head attention
 - Positional encoding
 - Encoder-decoder layers
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❖ **Identify use-cases in education, health, business, and creativity**

- **Education:**
 - Personalized tutoring and homework help
 - Automated grading and feedback
 - Language learning assistants
 - Content generation for study materials
- **Health:**
 - Symptom checking and triage bots
 - Patient communication support
 - Medical documentation automation
 - Mental health chatbots for support and guidance
- **Business:**
 - Customer service chatbots
 - Sales and marketing copy generation
 - Data analysis summaries
 - Automated meeting notes and scheduling assistants
- **Creativity:**
 - Story and poetry writing assistance
 - Brainstorming and idea generation
 - Music and art inspiration prompts
 - Script and dialogue creation for media

Lab 2: Types of Prompts and Prompt Engineering Basics

Overview of Prompt Types

1. Instructional Prompts

- Clear commands telling the model what to do.
- Example: *"Summarize the following article."*

2. Interrogative Prompts

- Questions asking the model for information or explanations.
- Example: *"What are the benefits of renewable energy?"*

3. Zero-shot Prompts

- Asking the model to perform a task without any examples.
- Example: *"Translate this sentence into French: 'Good morning.'"*

1. Try zero-shot vs few-shot prompts

- **Zero-shot:** Directly ask the model to do a task without any examples.
- **Few-shot:** Provide 2-3 examples before asking the model to perform the task.

2. Design prompts with increasing complexity

- Start with simple direct instructions or questions.
- Add context, examples, constraints, or multi-step instructions to increase complexity.

Sample Output: 5 Examples Each & Comparison

Instructional Prompts (Examples)

1. Summarize this paragraph about climate change.
2. List 3 advantages of electric cars.
3. Translate the following sentence to Spanish.
4. Explain how photosynthesis works.

Interrogative Prompts (Examples)

1. What is the capital of France?
2. How does a transformer model work?
3. Why is exercise important for health?
4. When was the first moon landing?
5. Who invented the telephone?

Zero-shot Prompts (Examples)

1. Translate "Good night" into German.
2. Generate a business email to request a meeting.
3. Summarize the plot of *Romeo and Juliet*.
4. List the main causes of World War I .
5. Write a recipe for chocolate chip cookies

Lab 3: Precision Prompting for Information Extraction

Objective: Extract structured data from ChatGPT responses.

Original Text: "John Doe, Software Engineer at TechSolutions Inc., can be reached at john.doe@example.com or +1-555-1234. LinkedIn: linkedin.com/in/johndoe. Graduated from MIT in 2022."

ChatGPT Output (JSON):

```
{  
  "name": "John Doe",  
  "role": "Software Engineer",  
  "email": "john.doe@example.com",  
  "linkedin": "https://linkedin.com/in/johndoe",  
  "graduation_year": 2022  
}
```

This structure is ideal for applications, websites, and databases.

Lab 4: Summarization and Text Transformation

Objective: Use ChatGPT for summarization, rewriting, tone transformation.

1. Summarization Prompt:

“Summarize the following article in three sentences.”

Example Input:

“Artificial Intelligence is evolving rapidly. Its applications span across industries from healthcare to finance. Researchers predict major breakthroughs in the next decade.”

Output:

“AI is advancing quickly and is used in many sectors. Experts believe more progress is coming soon. It could reshape major industries.”

2. Tone Transformation Prompt:

“Rewrite the email informally: ‘Dear Mr. Smith, I am writing to confirm our meeting scheduled for Monday. Please let me know if this still works for you.’”

Informal Output:

“Hey! Just checking if we’re still on for our Monday meeting. Let me know!”

Explanation:

Summarization is useful in news, research, and meetings. Tone transformation adapts messages to different audiences (e.g., formal for workplace, informal for friends).

Lab 5: ChatGPT in Code Generation and Debugging

Objective: Explore how ChatGPT can assist in programming.

1. Code Generation Prompt:

“Write a Python function to check if a string is a palindrome.”

Output:

```
def is_palindrome(s: str) -> bool:
    """Check if the string is a palindrome (ignoring punctuation and case)."""
    import re
```

```
s = re.sub(r'^A-Za-z0-9', '', s.lower())
return s == s[::-1]
```

Explanation:

The function uses regex to remove non-alphanumeric characters and then checks if the cleaned string is the same forward and backward.

2. Debugging Prompt:

Fix this buggy C program:

Original Code:

```
#include <stdio.h>
void reverse(char *s) {
    int i = 0, j = strlen(s) - 1;
    while (i < j) {
        char tmp = s[i];
        s[i] = s[j];
        s[j] = tmp;
        i++; j--;
    }
}
int main() {
    char str[] = "Hello";
    reverse(str);
    printf("%s\n", str);
    return 0;
}
```

Fix:

Add `#include <string.h>` at the top to avoid undefined reference to `strlen`.

ChatGPT helps spot missing libraries, logic bugs, or incorrect syntax.

Lab 6: Domain-Specific Applications

Objective: Apply ChatGPT to real-world, domain-specific problems.

Example – Medical Domain Chatbot:

Prompt:

"A patient says: 'I have an itchy red rash on my arms for three days, no fever, but it burns when I scratch it.'"

Expected ChatGPT Response:

Follow-up Questions:

- "Have you used any new skincare products recently?"
- "Does the rash have any blisters or pus?"

Suggestions:

1. Apply over-the-counter hydrocortisone cream.
2. Use an oral antihistamine like cetirizine for itchiness.

Advice:

"If symptoms worsen, spread, or persist for more than 5 days, consult a dermatologist."

Explanation:

Domain-specific prompts simulate real-world roles—doctor, lawyer, teacher—and can guide, diagnose, or instruct. This makes ChatGPT a valuable tool in industry and education.

Other Examples:

- Legal: Draft contracts or explain laws.
- Education: Create quizzes, tutor students.
- Business: Analyze reports, write summaries.